



**US Army Corps
of Engineers**

Construction Bulletin

No. 96-17 Issuing Office: CEMP-CP Issue Date: 8/26/96 Exp. Date: 31 DEC 98

CEMP-C

Subject: Exposure to Respirable Crystalline Silica During Construction Activities

Applicability: INFORMATION

1. REFERENCES.

- a. Code of Federal Regulations (CFR), 29 Parts 1926 and 1910.
- b. EM 385-1-1, USACE Safety and Health Requirements Manual.
- c. DCAF Bulletin 96-01 dated 18 January 1996, Subject: Silica-Fume Concrete.
- d. U.S. Department of Labor memorandum dated May 2 1996, subject: Special Emphasis Program (SEP) for Silicosis

2. PURPOSE. This Construction Bulletin (CB) provides important information on occupational health hazards associated with the exposure to crystalline silica during construction activities.

3. BACKGROUND.

a. An alert was released by the National Institute for Occupational Safety and Health (NIOSH) that reemphasizes and details the hazards related to crystalline silica exposure among construction workers and provides prevention recommendations. The Occupational Safety and Health Administration (OSHA) is also in the process of implementing an OSHA-wide Special Emphasis Program (reference 1d) to reduce or eliminate the workplace incidence of silicosis from exposure to crystalline silica (a copy of referenced memorandum is available at your local safety office). Under this program, OSHA will be conducting inspections and will target particular establishments and activities where exposure to crystalline silica is most likely to occur.

CEMP-CP

SUBJECT: Exposure to Respirable Crystalline Silica During Construction Activities

b. Crystalline silica may be of several distinct types. Quartz, a form of silica and the most common mineral in the earth's crust, is associated with many types of rock. Concrete and masonry products contain silica. Since these products are primary materials for construction, construction workers may be easily exposed to respirable crystalline silica during activities such as the following:

- (1) Chipping, hammering, and drilling of rock.
- (2) Crushing, loading, hauling, and dumping of rock.
- (3) Abrasive blasting using silica sand as the abrasive.
- (4) Sawing, hammering, drilling, grinding, and chipping of concrete or masonry.
- (5) Demolition of concrete and masonry structures.
- (6) Dry sweeping or pressurized air blowing concrete, rock, or sand.

c. The exposure to respirable crystalline silica dust during construction activities can cause silicosis - a serious and potentially fatal respiratory disease. Silicosis is a scarring and hardening of lung tissue that can result when particles of crystalline silica are inhaled and become embedded in the lung. The signs and symptoms of exposure to respirable silica (coughing, wheezing, decreased pulmonary function) are not immediately obvious. Often times the signs and symptoms occur months or years after exposure and not until permanent lung damage has occurred. The disease has no effective treatment. According to NIOSH's alert as outlined in the following recommendations, employers and workers can take practical steps to reduce the risk of exposure.

Note: Concrete containing silica-fume does not present the same health-hazard as crystalline silica. Silica fume is classified as "amorphous silica" and is also regulated under OSHA. There is less health-hazard potential from the inhalation of amorphous silica fume due to the small particle size and noncrystalline structure. The "Guide for the Use of Silica Fume in Concrete" ACI 234R-96 recommends that workers handling silica-fume concrete use appropriate protective equipment and procedures which minimize the generation of dust. The guide also recommends that workers refer to the manufacturer's material safety data sheets for the product being used for specific health and safety information.

4. **RECOMMENDATIONS.** NIOSH recommends the following measures to be taken in order to reduce exposure to respirable crystalline silica in the workplace and to prevent silicosis and possible death among construction workers:

a. Provide workers with training that includes information about health effects, work practices, and protective equipment for respirable crystalline silica. Recognize when silica dust may be generated and plan ahead to eliminate or control the dust at the source.

CEMP-CP

SUBJECT: Exposure to Respirable Crystalline Silica During Construction Activities

b. Do not use silica sand or other substances containing more than 1 percent crystalline silica as abrasive blasting materials.

c. Use engineering controls and containment methods such as wet drilling, or wet sawing of silica-containing materials to control the hazard. Routinely maintain dust control systems to keep them in good working order. Post warning signs to mark the boundaries of work areas contaminated with respirable crystalline silica.

d. Conduct air monitoring to measure worker exposures and ensure that controls are providing adequate protection for workers. Provide periodic medical examinations for all workers who can be exposed to respirable crystalline silica. Report all cases of silicosis to State health departments and OSHA.

e. Use adequate respiratory protection when source controls cannot keep silica below the permissible exposure limit (PEL)*. Wear disposable or washable protective clothes at the worksite. Shower and change into clean clothes before leaving the worksite to prevent contamination of cars, homes, and other work areas.

5. IMPLEMENTATION.

a. The NIOSH alert has been distributed to all USACE Safety and Occupational Health Offices. The intent is to ensure that the NIOSH's recommendations are evaluated against safety and health procedures currently in place to prevent or reduce exposure where construction activities occur. If you have any question regarding these recommendations, you should contact your local safety office for advice.

b. All construction personnel must be made aware of this health hazard and must assure that construction contractors are also aware of this alert and that all the above recommendations are fully implemented.

6. This Construction Bulletin has been coordinated with the following HQUSACE organizations: Office of the Chief Counsel (CECC-C); Safety and Occupational Health Office (CESO-ZA); and Operations, Construction and Readiness Division (CECW-O).



CHARLES R. SCHROER

Chief, Construction Division

* The OSHA PEL for silica in construction should be determined by using the method outlined in 1910.1000 (as specified in reference 1d). The American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) for silica varies from 0.05 to 0.1mg/m³ depending on the type of crystalline silica. EM 385-1-1 requires that USACE projects abide by the more stringent of the OSHA PEL or ACGIH TLV.